

### **REMARKS**

These amendments and remarks are in response to the Office Action dated April 30, 2008. Applicant requests a three-month extension of time and authorization is given to charge Deposit Account No. 50-0951 for the appropriate fees.

In the Office Action, claims 1-12 were rejected under 35 U.S.C. §103(a). The rejections are discussed in more detail below.

#### **I. Status of Claims**

The present application is a §371 National Phase of an earlier filed PCT application. During the International Phase of the PCT application, claim amendments were made, which were included as Annexes to the International Preliminary Report on Patentability (IPRP). Applicant filed a submission of the Annexes to the IPRP upon filing this national phase application, but the Examiner seems to have reviewed the claims as originally filed and published in the PCT application, and has apparently not taken the Annexes into account. Accordingly, and for the avoidance of doubt, this response amends the claims as originally filed in the PCT application, and reintroduces the amendments that were made during the PCT International Phase.

#### **II. Rejections to the claims based upon Art**

Claims 1-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over PCT Publication No. WO 03/095060 to Gandolfi et al. ("*Gandolfi*") in view of European Patent Publication No. 60238492 to Nagano ("*Nagano*").

Applicant respectfully disagrees that a person of ordinary skill in the art starting from *Gandolfi* and being aware of *Nagano* would have arrived at the results of the present application without exerting any inventive skill.

The apparatus recited in the present claims is, in fact, concerned with the problem of providing a tube bundle heat-exchange apparatus that displays an effective and long-lasting resistance against corrosive chemical agents flowing therein and the solution proposed for such a problem is that of having at least one titanium or titanium alloy tube coated with a layer of

zirconium or zirconium alloy, which is bonded to such a tube either metallurgically or through welding.

The protection of the heat-exchange apparatus from corrosion is ensured even in the harsh conditions in which such an apparatus works only if the zirconium or zirconium alloy layer is tightly bonded to the titanium or titanium alloy tube. It is to be borne in mind, in this respect, that the corrosiveness of the chemical agents inside the apparatus is strongly enhanced by the high temperatures at which the exchange apparatus operates. A tight bond between the zirconium (or zirconium alloy) layer and the titanium (alloy) tube is only obtained either metallurgically or through welding.

*Nagano* merely refers to a method of preventing corrosion of titanium or titanium alloy, which comprises an electrolytical deposition of zirconium or zirconium alloy on a titanium substrate, without specifying the kind of substrate. It is submitted that a very thin layer of zirconium (a "passive film") is deposited on a substrate, which is presumably a sheet or a plate. Moreover, such a film is quite loosely linked to the titanium substrate, due to the technique that has been used for its deposition.

Should a titanium tube of a bundle heat-exchange apparatus be coated with a film of zirconium by an electrolytic technique as disclosed in *Nagano*, the resulting zirconium coating would not be sufficiently uniform and it would not withstand the harsh conditions existing inside the apparatus (corrosive chemical agents, high temperatures and sudden changes of temperature, with consequent dilation and contraction phenomena), which would rapidly induce the formation of cracks and eventually the disruption of the coating.

Therefore, even if a person skilled in the art aware of *Gandolfi* and facing the above-outlined problem had taken *Nagano* into consideration (although applicant believes that such a person would not have combined the teachings of these documents, because *Nagano* belongs to a far removed technical field) and had applied its teaching to modify the apparatus known from *Gandolfi*, he or she would have not arrived at the present claims, because the coating thus obtained would have not ensured the required protection to a titanium tube to enable it to be used in a bundle heat-exchange apparatus.

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For the above reasons, it is submitted that the subject-matter of new claim 1 is patentable, and that the claim is therefore in condition for allowance. All remaining claims are dependent on claim 1 and they are, therefore, novel and inventive as well. Prompt issuance of a Notice of Allowance is therefore respectfully requested.

## **II. Conclusion**

Applicant has made every effort to present claims which distinguish over the prior art, and it is thus believed that all claims are in condition for allowance. Nevertheless, Applicant invites the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. In view of the foregoing remarks, Applicant respectfully requests reconsideration and prompt allowance of the pending claims.

Respectfully submitted,

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